

A dramatic painting of a tsunami wave crashing over a coastal landscape. The wave is massive, with a large, white, foamy crest that dominates the upper half of the frame. The water is a deep, dark blue-green, with white foam and spray visible as the wave breaks. In the foreground, the water is turbulent and dark. The background shows a hilly, green landscape with some buildings and a small body of water. The overall scene is one of immense power and destruction.

Tsunami!



# Tsunami!

## What Is a Tsunami?

A tsunami (tsu-NAH-mee) is a series of powerful undersea waves. It is usually caused by an underwater earthquake, landslide, or volcano. Any of these disturbances will send out circular waves, like the ripples in a pond when you toss in a pebble. Tsunami waves, though, are incredibly powerful and quick-moving. They can travel faster than a jet—about 600 to 900 kilometres an hour. The first of this series of waves may not be the largest. The danger from these waves can last for several hours after the first wave arrives at the shore.

## Deadly Waves

Tsunamis do not cause any damage until they hit land. In 1946, an earthquake in Alaska generated a wave that travelled more than 4000 kilometres to Hawaii. Sailors on a ship anchored off Hawaii were looking toward the harbour when they saw a huge wave rise out of the water. As they watched in horror, the wave crashed onto the shore. It inundated the coast, snapping palm trees as if they were toothpicks, carrying boats several metres inland, and reducing the timber in buildings to the size of metre sticks.

Yet the sailors had not even felt the wave pass under their ship! They didn't feel it because most of the wave was underwater. When it hit the shallow ground near the shore, the faster water behind piled up into a massive wall of water.

In 1964, an earthquake in Prince William Sound, Alaska, triggered a massive tsunami that travelled throughout the Pacific.

Most tsunamis occur in active volcanic regions, such as the Pacific Ocean.



Ring of Fire. This area is known as the Ring of Fire because of the frequency of earthquakes and volcanic eruptions in the region.



Enormous waves crashed against Vancouver Island and travelled up one inlet to the city of Port Alberni—just four hours after the earthquake occurred. The first wave caused massive flooding in Port Alberni. Log booms broke loose and were scattered about the area. An hour later, a far more destructive wave hit. This second wave caused extensive damage by swamping many boats. It also picked up homes and cars, hurling them further inland.

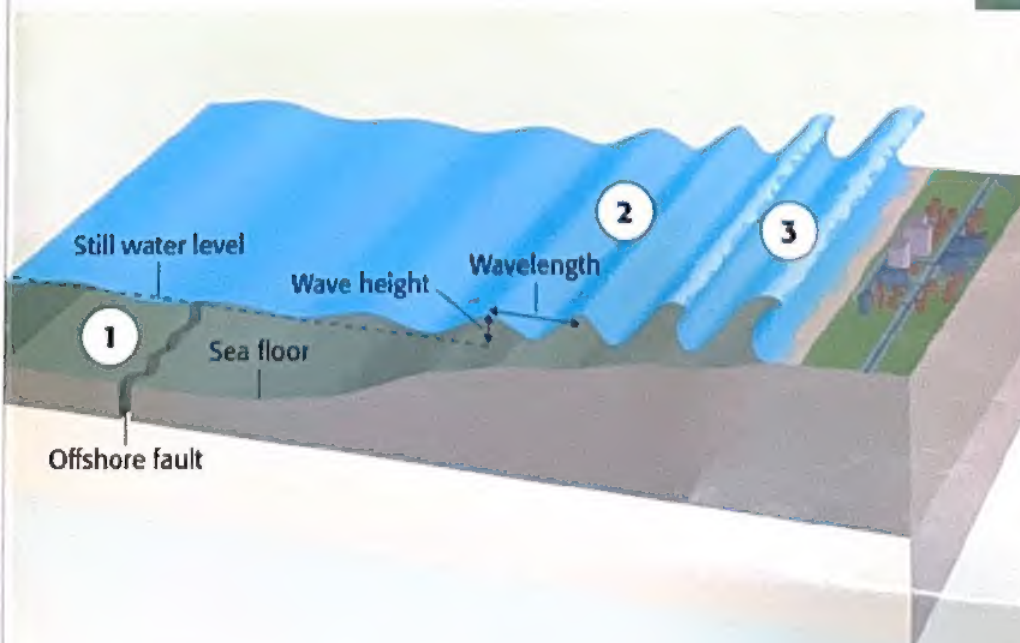
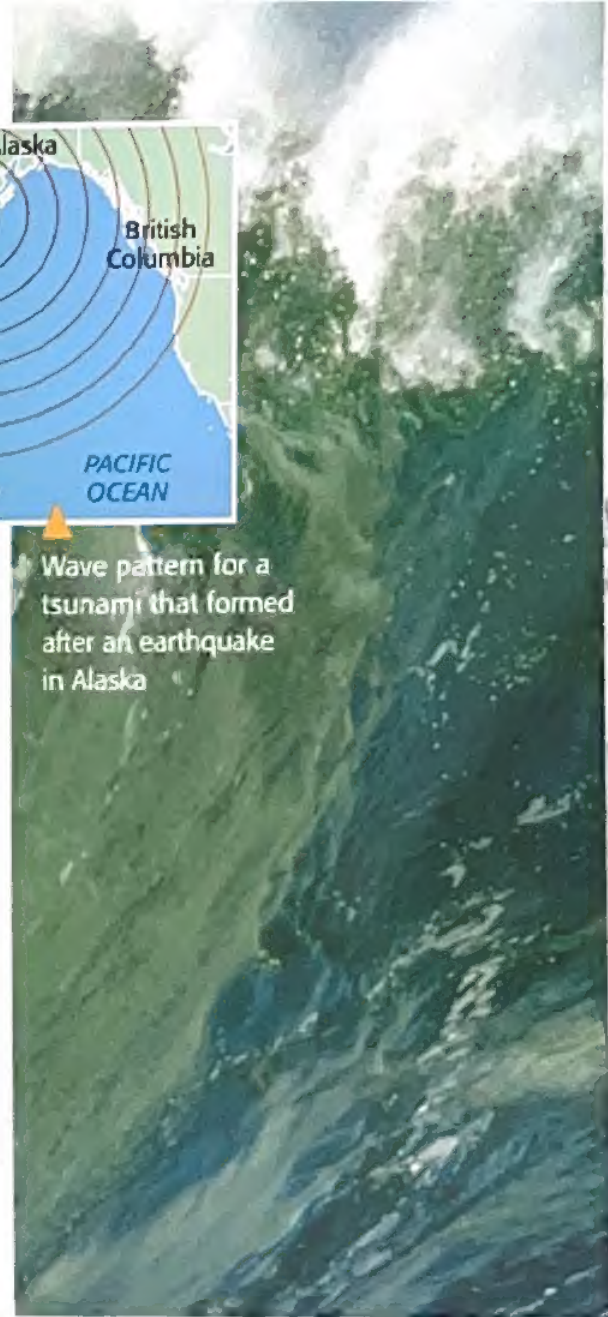
Some tsunamis can be deadly, as well as destructive. When the volcano on the island of Krakatoa, Indonesia, erupted in 1883, it created waves that were 35 metres high. The waves crashed against the islands of Java and Sumatra. More than 36 000 people died.

## Detection

Tsunamis cannot be prevented, but islands and coastal areas around the Pacific now have a warning system. Instruments called **seismographs** pick up disturbances in the ocean. Tide gauges attached to buoys measure the speed of waves and then relay information to research centres via satellites. If scientists detect a fast-moving wave, they can warn people in its path to evacuate the area.



Wave pattern for a tsunami that formed after an earthquake in Alaska



## How a Tsunami Forms

1. An underwater earthquake, landslide, or volcano creates a series of powerful waves.
2. The waves move rapidly outward. As the waves approach shore, they get bigger (wave height increases). At the same time, the distance between the waves gets smaller (wavelength decreases).
3. When the deepest part of a wave nears shore, it slows down. Water behind the wave rushes forward, forming a massive wall of water that then collapses onto the shore.



**Tsunami!****Text Type**

Explanation

**Text Features**

Heading and Subheadings

Photographs

Maps, Legend, and Captions

Cutaway Diagram

Numbered Text (steps in a process)

Boldfaced Term

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